Postel

Network Working Group
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Comments on memory allocation control commands (CEASE, ALL, GVB, RET) and RFNM

The protocol provides a scheme for buffer allocation. This scheme is rather complicated because it necessitates two parallel mechanisms. It is not obvious that both are necessary. In fact it is suggested that this scheme could be probably replaced by a slightly different conception of the Request for Next Message (RFNM). Now the RFNM is sent back from the receiving imp after the message has been reconstituted and the first packet transmitted to the host. Nothing insures that the whole message has been accepted and correctly received by the host; also the design of the host imp interface permits the host to stop accepting data from the imp during any length of time; as the link has been already unblocked by sending back the RFNM another message may be transmitted by the sending foreign host which will congest the imp's memory. On the other hand it is probable that usually the host is able to accept data from the imp at a higher rate than it is transmitted on the network, e.g. 200k bits/sec; thus the time to transmit a full message from the imp to the host would be approximately 1/20th of a second which is 10 times less than the average delay of transmission of a message over the network. This indicates that to send a RFNM after the reception of a full message by the host would not increase significantly the response time on the network.

In this case there is no reason why the RFNM could not be initiated by the receiving host as an acknowledgment of the correct reception of the message (ACK), and take the form of either a host imp or a control command message. This RFNM could have the two forms

ACK (CONTINUE)

or ACK (CEASE)

This would permit to add to the message some error detecting redundancy, such as check sum bits as proposed in [DELO 69]. In the present design nothing insures that one or several bits of the text has not been altered, e.g., by an interference or a deficiency of one of the host imp interfaces. This could have important consequences, e.g. if the text is used to update a centralized data base. Also, if the user has a way of detecting the error, but none of correcting it, it has no way of asking for the retransmission of the message, which has probably been discarded at the sending end upon reception of the RFNM. In fact it seems not up to the user to have to detect errors in its text but rather up to the NCP: the user process must as much as possible act as if it was talking to some other local process. So a third

kind of RFNM sent by the NCP could be:

NAK(REPEAT)

Repetition would also be initiated in case of no reply.

Thus we see that it seems worthwhile to make these slight modifications which would permit to use between the sending host and the receiving host a very simple point-to-point transmission procedure which would insure control of the data transmitted from end-to-end.

It could also replace the memory allocation mechanism: ACK (CONTINUE) would only be sent if space was available for a new message on this connection and/or ACK (CEASE) would be sent if no more space was available; it corresponds to the WABT of classic transmission procedures [USAS69]; transmission could be resumed by an ACK (CONTINUE) or a RESUME from the receiving end. The user process is not mixed at all with this memory allocation which is a function of the system (or NCP): it only sees a varying global transmission speed of its data on a connection. The imp programs take care of the routing of the data according to the distributed nature of the network, and neither the user nor the system (or NCP) is concerned with it. Other improvements to the protocol may be found after experiencing it.

Finally note that this solution does not immobilize the imp memory any longer than the actual solution, because it is not the imp which has to repeat a message, but the sending host.

DELO 69 DELOCHE G. Implementation of the Host-Host Software Procedures in GORDO Network Working Group RFC #11 Aug 1969

USAS 69 Proposed USA standard data communication control procedures for USASCII CACM Vol. 12 NB 3 March 1969 PB 166-178